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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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John Trezza

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FOLEY & LARDNER LLP
150 EAST GILMAN STREET
P.O. BOX 1497
MADISON, WI 53701-1497

EXAMINER

BELLO, AGUSTIN

ART UNIT

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2613

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/896,797	Applicant(s) TREZZA, JOHN	
	Examiner Agustin Bello	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 February 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 and 42-61 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 and 42-61 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/22/10, 2/18/10</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/05/10 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-34 and 42-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams (U.S. Patent No. 6,763,157), hereafter "Williams ('157)," in view of Williams (Patent No. US 6,614,949 B2), hereafter "Williams ('949)."

Regarding claim 1, Williams ('157) teaches a plurality of groups of optical devices (i.e. any of the transmitters or receivers in Figures 1-4, including a single transmitter or receiver representing a group of one), wherein at least one of the plurality of groups comprises at least two optical devices (i.e. the columns of transmitters 44 or receivers 46 in Figure 4 or any of the columns or rows of transmitters or receivers in Figures 1-3 taken together), wherein the at least two optical devices in a group are of a common device type formed on a common substrate (column 1 lines 30-31) sharing a common data signal contact (column 6 lines 64 – column 7 line

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6), and wherein an optical device is separated from another optical device by at least one trench (column 4 line 24-33), and a controller (column 2 lines 46-51), coupled to the at least two optical devices and configured to select one of the at least two optical devices in the group to be active at a given time to optically couple with an optical fiber (reference numeral 12 in Figure 1, 22 in Figure 2, 32 in Figure 3, and 42 in Figure 4). Williams ('157) differs from the claimed invention in that Williams ('157) fails to specifically teach that the disclosed groups are separated from each other by at least one grouping trench, wherein the grouping trench extends into the common substrate from a second side of the common substrate opposite the first side of the common substrate. However, Williams ('949) teaches that grouping trenches are well known in the art (column 4 lines 40-57), and further that grouping trenches (reference numeral 64, 68 in Figure 4; 64, 70 in Figure 5) that extends into the common substrate from a second side of the common substrate (reference numeral 72 in Figure 6) opposite the common substrate (reference numeral 50, 70 in Figure 5; 50, 72 Figure 6) are well known in the art. One skilled in the art would have been motivated to separate groups from each other by at least one grouping trench in order to establish a distributed pattern of standoff structures between the groups of optical devices (column 4 lines 48-55 of Williams '949). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to separate groups from each other by at least one grouping trench.

Regarding claims 2 and 15, Williams ('157) teaches that the at least two optical devices in the group are lasers (column 1 lines 26-34).

Regarding claims 3, 4, 16, and 17, Williams ('157) teaches that the lasers comprise top/bottom emitting lasers (i.e. VCSEL of column 1 lines 26-34).

Regarding claims 5, 18, both Williams references differ from the claimed invention in that Williams fails to specifically teach that the lasers comprise either Bragg reflector lasers or distributed feedback lasers. However, the claimed lasers are well known in the art and Official Notice is given to that effect. Furthermore, Williams discloses that the invention is not limited to any single type of laser, thereby suggesting the invention's compatibility with lasers such as those claimed in the instant application (column 11 lines 60-62). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use either Bragg reflector lasers or distributed feedback lasers in the system of Williams.

Regarding claims 7 and 20, Williams ('157) teaches that the at least two optical devices in the group comprise photodetectors (column 1 lines 26-50).

Regarding claims 8 and 21, Williams ('157) teaches that the photodetectors comprise top receiving photodetectors (inherent).

Regarding claims 9 and 22, both Williams references differ from the claimed invention in that Williams fails to specifically teach that the photodetectors comprise bottom receiving photodetectors. However, the claimed photodetectors are well known in the art and Official Notice is given to that effect. Furthermore, Williams discloses that the invention is not limited to any single type of photodetector, thereby suggesting the invention's compatibility with photodetectors such as those claimed in the instant application. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to use bottom receiving photodetectors in the system of Williams.

Regarding claims 10 and 23, Williams ('157) teaches that the plurality of groups of optical devices comprise lasers and photodetectors (Figure 4).

Regarding claims 11 and 24, Williams ('157) teaches a memory configured to store activation information for the at least two optical devices in the group (abstract; column 2 lines 15-18).

Regarding claims 12 and 25, Williams ('157) teaches redundancy selection circuitry (abstract).

Regarding claims 13, 26, 42, and 52, Williams ('157) teaches multiple lasers (reference numeral 44 in Figure 4) formed on a first side of a common substrate (i.e. the inherent substrate upon which elements 44 in Figure 4 are formed), multiple detectors (reference numeral 46 in Figure 4), storage (abstract; column 2 lines 15-18), a controller coupled to the storage (column 2 lines 46-51; column 3 lines 3-10), and an interface (column 1 lines 35-50) via which a single optical fiber can be coupled to at least two of the multiple lasers that are adjacent to each other, or at least two of the multiple detectors that are adjacent to each other, wherein the storage is configured to identify, among a grouped set of redundant optical devices, an optical device that will be an active optical device (abstract; column 2 lines 46-51; column 9 lines 58-60), and wherein the redundant optical devices include the at least two of the multiple lasers or the at least two of the multiple detectors, and, and wherein the redundant optical devices in the grouped set share a common data input and a common electrical contact (column 6 line 60 – column 7 line 6). Williams ('157) differs from the claimed invention in two manners.

First, Williams ('157) fails to specifically teach that the number of lasers is unequal to the number of detectors. However, as a matter of design choice and as suggested by Williams (column 7 lines 26-34), one skilled in the art would clearly have recognized that the number of lasers could have been selected to not equal the number of receivers. One skilled in the art

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would have been motivated to do so in order to transmit/receive more information than is to be received/transmitted. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to design the apparatus of Williams ('157) so that the number of lasers is unequal to the number of detectors.

Second, Williams ('157) fails to specifically teach that the grouped set is defined by a grouping trench, wherein the grouping trench extends from a second side of the common substrate opposite the first side of the common substrate. However, Williams ('157) discloses that trenches surrounding optical components are well known in the art (column 4 lines 23-33), thereby suggesting grouping trenches. Furthermore, Williams ('949) teaches that grouping trenches are well known in the art (column 4 lines 40-57), and further that grouping trenches (reference numeral 68 in Figure 4) that extend into the common substrate from a second side of the common substrate (reference numeral 72 in Figure 6) opposite the first side of the common substrate (reference numeral 50, 70 in Figure 5 and Figure 6) are well known in the art. One skilled in the art would have been motivated to separate groups from each other by at least one grouping trench in order to establish a distributed pattern of standoff structures between the groups of optical devices (column 4 lines 48-55 of Williams '949). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to separate groups from each other by at least one grouping trench.

Regarding claim 14, Williams ('157) teaches at least two optical devices of a first type (i.e. leftmost 34 within reference 32 in Figure 3; reference 34a within the upper rightmost circle in Figure 3) formed adjacent to each other and formed on a first side of a common substrate (column 1 lines 30-31) to form a group (as seen in the rows and columns in any of Figures 1-4),

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and is configured for coupling to a single optical fiber (i.e. leftmost 34 couples to single fiber 32 in Figure 3; reference 34a couples to the upper rightmost fiber in Figure 3); an optical device of a second type different from the first type (reference numeral 36 in Figure 3) and configured for coupling to a second optical fiber (i.e. a second fiber of a bundle (column 1 lines 51-65; any of the lower six circles in Figure 3), wherein the at least two optical devices of the first type are related to each other by a common connection (column 6 line 60 – column 7 line 6) such that they can each receive a single source signal and are individually selectable for activation a given time (column 4 lines 19-23) such that one of the at least two optical devices can be automatically substituted for another of the at least two optical devices if the other of the at least two optical devices is a bad device (column 2 lines 15-18). Williams ('157) differs from the claimed invention in that Williams ('157) fails to specifically teach that the disclosed groups are separated from each other by at least one grouping trench, wherein the grouping trench extends into the common substrate from a second side of the common substrate opposite the first side of the common substrate. However, Williams ('949) teaches that grouping trenches are well known in the art (column 4 lines 40-57), and further that grouping trenches (reference numeral 68 in Figure 4) that extend from a second side of the common substrate (reference numeral 72 in Figure 6) opposite the common substrate (reference numeral 50, 70 in Figure 5 and Figure 6) are well known in the art. One skilled in the art would have been motivated to separate groups from each other by at least one grouping trench in order to establish a distributed pattern of standoff structures between the groups of optical devices (column 4 lines 48-55 of Williams '949). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to separate groups from each other by at least one grouping trench.

Regarding claim 27, Williams ('157) teaches storage configured to store active indication (abstract; column 2 lines 15-18).

Regarding claim 28, Williams ('157) teaches that the group of optical devices comprise lasers (column 1 lines 26-34) or photodetectors (column 1 lines 26-50).

Regarding claim 30, Williams ('157) teaches a common electrical connection among all of the optical devices in the group (column 6 line 60 – column 7 line 6).

Regarding claim 31, Williams ('157) teaches that the optical devices within the group are separated by at least one separation trench (inherent in the ability of Williams' apparatus to seamlessly switch from a failed emitter to a redundant emitter).

Regarding claim 32, Williams ('157) teaches multiple fusible links, wherein the active device is determined by a state of at least one of the multiple fusible links (column 2 lines 58-63).

Regarding claim 33, Williams ('157) teaches growing active portions of multiple optical devices on a first side of a wafer using a semiconductor material (column 4 lines 23-33), processing the wafer to create complete optical devices patterning the semiconductor material to create individual optical devices (column 4 lines 23-33), grouping the devices by forming trenches (column 4 lines 28-30) in the wafer around the individual devices of a common type; and connecting each of the at least two devices to a control circuit such that, common data can be received by any of the at least two devices in a set (column 8 lines 40-45) from a single optical fiber (i.e. any one of fibers 32 in Figure 4) but the common data will only be handled by a device of the at least two devices in the set that is an active device (column 6 lines 47-49). Williams ('157) differs from the claimed invention in that Williams ('157) fails to specifically teach that

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the disclosed groups are separated from each other by at least one grouping trench, wherein the grouping trench extends into the common substrate from a second side of the common substrate opposite the first side. However, Williams ('949) teaches that grouping trenches are well known in the art (column 4 lines 40-57), and further that grouping trenches (reference numeral 68 in Figure 4) that extend into the common substrate from a second side of the common substrate opposite the first side of the wafer (reference numeral 50, 70 in Figure 5 and Figure 6) are well known in the art. One skilled in the art would have been motivated to separate groups from each other by at least one grouping trench in order to establish a distributed pattern of standoff structures between the groups of optical devices (column 4 lines 48-55 of Williams '949). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to separate groups from each other by at least one grouping trench.

Regarding claim 34, Williams ('157) teaches identifying the active device from the at least two devices in the set and storing data for identifying the active device (abstract; column 2 lines 15-18, 46-52).

Regarding claims 43-46, Williams ('157) differs from the claimed invention in that Williams fails to specifically teach that claimed ratios of transmitters to receivers. However, as a matter of design choice and as suggested by Williams (column 7 lines 26-34), one skilled in the art would clearly have recognized that the ratio of transmitters to receivers could have been selected to be any ratio including those claimed. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to fix the ratio of transmitters to receivers to any of the claimed ratios.

Regarding claim 47, Williams ('157) teaches that the laser transmitters are organized as at least two groups (as seen in any of Figures 1-4, wherein the lasers are organized in groups of rows and columns).

Regarding claims 48 and 49, Williams ('157) teaches that one of the at least two groups comprises two or three lasers (as seen in Figure 3) and one of the lasers is a backup (i.e. the redundancy provided by Williams).

Regarding claims 50 and 51, having exactly one or two of three lasers as the backup laser is well within the scope of Williams' ('157) redundancy scheme.

Regarding claim 53, Williams teaches that the first transmitter further comprises a programmable laser selection control (column 4 lines 52-65).

Regarding claim 54, Williams ('157) teaches that the first transmitter further comprises a transmitter failure detection sensor (column 6 lines 47-59).

Regarding claim 55, Williams ('157) teaches an automatic failover circuit (column 6 line 60 – column 7 line 6).

Regarding claim 56, the combination of Williams ('157) and Williams ('949) teaches the optical module of claim 1, wherein the at least two of optical devices in the group are configured to have carrier movement therebetween (i.e. there being no recited structural difference between the optical devices in the group of the claimed invention and that of the cited prior art, the at least two of optical devices in the group of the prior art are also capable of have carrier movement therebetween).

Regarding claim 57, the combination of Williams ('157) and Williams ('949) teaches the optical module of claim 56, wherein the common substrate is electrically conductive (column 1

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lines 25-50 of Williams ('157)) , and wherein the carrier movement is through the electrically conductive common substrate (i.e. substrate throughout both Williams).

Regarding claim 58, the combination of Williams ('157) and Williams ('949) teach the optical module of claim 1, wherein the optical devices within one group are separated by at least one separation trench configured to isolate individual device contacts (column 4 lines 23-33 of Williams ('157) and column 2 lines 29-34 of Williams ('949)).

Regarding claim 59, the combination of Williams ('157) and Williams ('949) teach the optical module of claim 1, wherein the controller is inherently coupled to the optical devices via contact pads.

Regarding claim 60, the combination of Williams ('157) and Williams ('949) teach the optical module of claim 59, wherein the controller is disposed on an electronic chip, and wherein the optical devices are flip-chip bonded to the electronic chip (column 1 lines 20-44 of Williams ('949) and column 1 lines 25-50 of Williams ('157)).

Regarding claim 61, combination of Williams ('157) and Williams ('949) teach the method of claim 33, wherein connecting each of the at least two devices to a control circuit comprises flip-chip bonding the at least two devices to an electronic chip containing the control circuit chip (column 1 lines 20-44 of Williams ('949) and column 1 lines 25-50 of Williams ('157)).

Allowable Subject Matter

4. Claims 6, 19, 29, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

5. Applicant's arguments filed 02/05/10 have been fully considered but they are not persuasive.

Applicant argues that the combination of the Williams references fails to meet the newly added limitation of a grouping trench that extends into the common substrate from a second side of a common substrate opposite the first side of a common substrate. However, the examiner disagrees.

The examiner maintains that Williams ('949) teaches this newly added limitation. Specifically, grouping trenches are formed between epoxy hardener material 70 in Figure 5 within which electro-optical elements 66 are formed. After removal of layers 60, 62, and 64 by the process described in conjunction with Williams' first embodiment and second embodiment, a plurality of optical devices within grouping trenches are formed as shown in Figure 6. Each of these optical devices are formed on a first side of a common substrate, now elements 50 and 70 in Figures 5 and 6, and the grouping trenches formed by the etched cavities of epoxy hardener material 70 clearly extend into the common substrate from a second side of the common substrate opposite the first side of the common substrate, i.e. the top layer of epoxy hardener material 72 in Figure 6, towards the first side of the common substrate. The examiner stresses that once epoxy hardener 70 in Figure 5 is bonded with substrate 50 in Figure 5 and 6, it forms a single substrate, the upper surface of which is etched in a direction towards the first side of the common substrate, thereby meeting applicant's new claim language. Furthermore, the examiner relies on Williams for disclosure of mounting optical devices a first side of a common substrate.

In response to applicant's argument that Williams' '949 grouping trenches fail to meet applicant's claimed grouping trenches, the examiner notes that each of Williams' '949 grouping trenches contains at least two optical devices by virtue of grouping a plurality of optical devices as disclosed. Furthermore, Williams '157 clearly discloses grouping at least two optical devices.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the examiner has noted a suggestion in the Williams ('157) patent and motivation in the Williams ('949) patent to combine or modify the teachings of the prior art.

In response to applicant's argument that the combination of the Williams references render the invention of Williams unsatisfactory for its intended purpose, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In the instant application the examiner asserts that the combined teachings of the references would have suggested to those of ordinary skill in the art that the use of grouping trenches would have been beneficial to isolate a plurality of optical devices from one another.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (571) 272-3026. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Primary Examiner
Art Unit 2613